What is claimed is:

1. A catalyst for carbon oxide methanation reactions for fuel cells comprising a metal capable of forming a metal-carbonyl species on a support having a predetermined pore size of sufficient dimensions to allow the pore to accommodate a fully carbonylated metal complex.

2. The catalyst of Claim 1 wherein the support is a crystalline alumino-silicate.

3. The catalyst of Claim 1 wherein the support is selected from the group consisting of a molecular sieve, beta-zeolite, mordenite, faujasite, any other alumino-silicate with a regular lattice structure, alumina, titania, ceria, zirconia and combinations thereof.

4. The catalyst of Claim 3 wherein the support is selected from the group consisting of a beta-zeolite, mordenite, and faujasite.

5. The catalyst of Claim 1 wherein the metal is selected from the group consisting of ruthenium, rhodium, platinum, palladium, rhenium, nickel, iron, cobalt, lead, tin, silver, iridium, gold, copper, manganese, zinc, zirconium, molybdenum, other metals that form a metal-carbonyl species and combinations thereof.

6. The catalyst of Claim 5 wherein the metal is selected from the group consisting of ruthenium, rhodium and nickel.

7. The catalyst of Claim 6 wherein the metal is ruthenium.

8. The catalyst of Claim 1 further comprising an inert binder.

9. The catalyst of Claim 8 wherein the binder is selected from the group consisting of alumina, γ-Al_2O_3, SiO_2, ZrO_2, TiO_2 or pseudo-boehmite.

10. The catalyst of Claim 1 wherein the metal is added to the support through impregnation, incipient wetness method, immersion and spraying.

11. The catalyst of Claim 7 wherein the ruthenium is added to the support through impregnation.

12. The catalyst of Claim 4 wherein the support has a pore volume in the range of from about $0.3cm^3/g$ to about $1.0cm^3/g$.

13. The catalyst of Claim 12 wherein the metal is ruthenium impregnated on the support so as to deliver a

concentration of from about 0.5 wt% Ru to about 4.5 wt% Ru, based on the total weight of the catalyst including the ruthenium.

14. A catalyst for carbon oxide methanation reactions for fuel cells comprising a metal capable of forming a metal-carbonyl species on a support having a pore volume in the range of from about $0.3cm^3/g$ to about $1.0cm^3/g$.

15. The catalyst of Claim 14 wherein the support is selected from the group consisting of a crystalline alumino-silicate, a molecular sieve, beta-zeolite, mordenite, faujasite, any other alumino-silicate with a regular lattice structure, alumina, titania, ceria, zirconia and combinations thereof.

16. The catalyst of Claim 14 wherein the metal is selected from the group consisting of ruthenium, rhodium, platinum, palladium, rhenium, nickel, iron, cobalt, lead, tin, silver, iridium, gold, copper, manganese, zinc, zirconium, molybdenum, other metals that form a metal-carbonyl species and combinations thereof.

17. The catalyst of Claim 14 further comprising an inert binder.

18. The catalyst of Claim 17 wherein the binder is selected from the group consisting of alumina, γ-Al_2O_3, SiO_2, ZrO_2, TiO_2 or pseudo-boehmite.

19. The catalyst of Claim 14 wherein the metal is ruthenium impregnated on the support so as to deliver a concentration of from about 0.5 wt% Ru to about 4.5 wt% Ru, based on the total weight of the catalyst including the ruthenium.

20. A catalyst for carbon oxide methanation reactions for fuel cells comprising a metal selected from the group consisting of ruthenium, rhodium, platinum, palladium, rhenium, nickel, iron, cobalt, lead, tin, silver, iridium, gold, copper, manganese, zinc, zirconium, molybdenum, other metals that form a metal-carbonyl species and combinations thereof on a support having a pore volume in the range of from about $0.3cm^3/g$ to about $1.0cm^3/g$, wherein the support is selected from the group consisting of a crystalline alumino-silicate, a molecular sieve, beta-zeolite, mordenite, faujasite, any other alumino-silicate with a regular lattice structure, alumina, titania, ceria, zirconia and combinations thereof.

21. The catalyst of Claim 20 further comprising a binder selected from the group consisting of alumina, γ-

Al_2O_3, SiO_2, ZrO_2, TiO_2 or pseudo-boehmite.

22. The catalyst of Claim 20 wherein the metal is ruthenium impregnated on the support so as to deliver a concentration of from about 0.5 wt% Ru to about 4.5 wt% Ru, based on the total weight of the catalyst including the ruthenium.

23. A catalyst for carbon oxide methanation reactions for fuel cells comprising ruthenium impregnated on the support so as to deliver a concentration of from about 0.5 wt% Ru to about 4.5 wt% Ru, based on the total weight of the catalyst including the ruthenium, wherein the support is selected from the group consisting of a beta-zeolite, mordenite and faujasite.

24. The catalyst of Claim 23 wherein the support has a pore diameter of greater than about 6.3Å and a pore volume in the range of from about $0.3cm^3/g$ to about $1.0cm^3/g$.

25. The catalyst of Claim 23 wherein the catalyst further comprises the binder γ-Al_2O_3 at a loading of about 20 wt%, including the weight of the binder.

26. A method for carbon oxide methanation reactions for fuel cells using a catalyst comprising a metal capable of forming a metal-carbonyl species on a support having a predetermined pore size of sufficient dimensions to allow the pore to accommodate a fully carbonylated metal complex, the method comprising passing a mixture of gases over the catalyst in a reaction zone having a temperature below the temperature at which the shift reaction occurs and above the temperature at which the selective methanation of carbon monoxide occurs.